



MINISTRY OF DEFENSE
BRAZILIAN ARMY
LOGISTICS COMMAND
SUPPLY BOARD

CHEFIA DE SUPRIMENTO (SUPPLY BOARD)	ISSUED: April, 16th, 2024.
BALLISTIC HELMET LEVEL III-A	SPECIFICATION: Nr 211/2024 – C Sup

1. TECHNICAL FEATURES

1.1 General

- a. The ballistic helmet shall be in accordance with NIJ STD 0106.01 and NIJ STD 0108.01.
- b. The ballistic helmet shall have ballistic resistance against level III-A (9 mm and .44 Mag) of NIJ STD 0108.01 when tested per NIJ STD 0106.01, **including successful attenuation tests for 9 mm**.
- c. The shape of the shell might be in accordance to ACH (Advanced Combat Helmet) or ACH-HC (Advanced Combat Helmet - High Cut) type.
- Note: In this document, ACH is equal to ACH Full Cut or Regular Cut.
- d. Sizes: S, M and L.
- e. Depending on the helmet type the maximum total weight **with accessories** (accessory rails and NVG Shroud) shall be in accordance with Tables 1 or 2.

Table 1 – ACH Maximum weight of ballistic helmet in kilograms (with accessories)

SIZE			
S	M	L	XL
1,67	1,70	1,73	1,76

Table 2 – ACH-HC Maximum weight of ballistic helmet in kilograms (with accessories)

SIZE			
S	M	L	XL
1,51	1,54	1,57	1,60

- f. The maximum total weight **without accessories** (accessory rails and NVG Shroud) of the ACH helmet type shall be in accordance with Table 3.

Table 3 – ACH Maximum weight of ballistic helmet in kilograms (without accessories)

SIZE			
S	M	L	XL
1,55	1,58	1,61	1,64

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g. The ballistic helmet shall have a validity of at least 5 years.

h. The helmet shall utilize a modular pad suspension system consisting of a series of pads that act as the suspension system between the wearer's head and the helmet shell.

i. The helmet shall have a 4-point retention system, two points on the front half of the helmet (close to the temple region of the head) and other two on the rear half, each symmetric about the helmet mid-sagittal centerline, allowing adjustment for proper fit and stability. The color of the retention system shall be Foliage Green and shall also have at least the following characteristics:

- the chin strap shall have a finish that allows for adjustment and accommodation to the user's chin;
- it shall provide adjustment for various head sizes and shapes while maintaining user comfort. To achieve this, adjustment of the straps located on the jugular sides and temples must be done through sliding regulators of the sliding control type made of high-resistance polymer;
- it shall have a quick-release buckle with easy release, located on the left side, interconnected to the lateral adjustment straps (jugular) and temples, made of high-resistance polymer; and
- it must have a system for adjusting the cranial circumference made by rotation or button switching located at the back of the helmet, with internal finishing for comfortable accommodation on the user's head (Figure 21).

j. **Depending on the contracting party's request** the helmet shall have the accessories specified in this document (Section 2). The ACH-HC shall be delivered always with all accessories defined in Section 2. **All parts (components and accessories) shall be delivered together and assembled. Moreover, spare parts (components and accessories) shall be delivered inside the same pack or box as the helmet.**

l. All hook-and-loop fasteners shall be olive green and made of nylon.

k. AT ANY TIME DURING ITS USEFUL LIFETIME, THE MATERIAL MAY HAVE ITS BALLISTIC PERFORMANCE TESTED. IN CASE OF UNSATISFACTORY PERFORMANCE THE WARRANTY CAN BE ACTIVATED.

1.2 Shell

a. **Depending on the contracting party's request the shape of the shell shall be in accordance to ACH or ACH-HC helmet types (Figure 2).**

b. The coating of the shell shall completely and uniformly cover the shell surface and the outside of the edging, on green, number 34.097 of FED STD-595. The final coat made to the exterior shall contain the texturing aggregate. Texturing aggregate incorporated in the final coat for the exterior of the helmet shall be silica sand or walnut shell flour. **PLASTIC/ABS/PU COVER WILL NOT BE ACCEPTED.**

c. Coating of the exterior surface of the shell consists of the primer layer and a minimum of two layers of coating and an additional layer of textured coating. All these layers of coating shall be applied uniformly on the exterior surface of the helmet shell. Coating shall be strongly bonded to the shell and shall be anti-scratch and anti-peel. After drying, no cracks, scuffed areas, blemishes such as peeling, blistering or flaking, foreign matter appearing on or embedded in the finish shall be visible in the coating. Texturing aggregate incorporated in the final coat for the exterior of the helmet shall be silica sand or walnut shell flour. The aggregate shall be uniformly applied to cover the entire exterior of the shell including the outside of the edging.

d. The outer surface of the helmet shell must have loop fasteners on the top, sides, and nape area to allow better attachment of the helmet cover or for placement of identification patches:

- loop fasteners on the top (Figures 5): they shall be positioned centrally at the top of the helmet shell and shall be symmetrical in relation to the helmet's midsagittal central plane. The dimensions are A (5.0 ± 0.3)

cm), B (4.0 ± 0.3 cm) and C (5.0 ± 0.3 cm). the largest loop fastener is 20.5 ± 0.5 cm long from one end to the other.

- loop fasteners on the side (Figures 6): There shall be a loop fastener on each side of helmet shell and they shall be symmetrical in relation to the helmet's midsagittal central plane. The dimensions are D (10.0 ± 0.5 cm), and E (5.0 ± 0.5 cm).

- loop fastener on the nape area (Figures 7): it shall be symmetrical in relation to the midsagittal central plane of the helmet and close to the bottom edge. The dimensions are F (5.0 ± 0.3 cm), and G (15.5 ± 0.5 cm). The length of the top and bottom parts of the loop fastener is 17 ± 0.5 cm

1.3 Pad Suspension System

a. The pads shall possess means of easy attachment, removal, and reattachment to the inside helmet shell. The pad suspension system shall attach, remove, and reattach to the helmet shell via hook tape disks permanently adhered to the inside of the helmet shell. The pads shall remain firmly in place when attached. The ease of attachment of the pads and the ability to attach the pads where the wearer desires (i.e. in a variety of locations) shall permit accommodations among different size and shape heads. There are three different pad shapes that form the suspension system, round, trapezoidal, and oblong. A complete pad suspension kit shall consist of seven pads as follows: one round pad (crown), two trapezoidal pads (front and back), and four oblong pads (distributed around the perimeter to achieve comfort and stability). The pads are 3/4-inch thick.

Note: a pad suspension system with at least seven pads and with a configuration different from that specified must be previously authorized by the contracting party.

b. The pad shall have at least three basic layers or be designed in such as way as to function in three ways: an inner layer shall contact the wearer's head, a padding layer, and an outer material layer which attaches the pad to the hook disk inside helmet shell. The three layers shall be permanently joined around the perimeter to prevent disassembly. The inner material that contacts the wearer's head shall wick moisture away from the wearer's head and absorb it. The padding material shall providing moisture-wicking. The outer material shall be made of a loop-type material and allow the pad to be attached to the inside of the helmet shell.

1.4 Edge Protection

The shell shall have a firmly bonded or an integrally molded edging that protects the periphery of the shell from delamination, wear, cuts, and tear. If the edging is integrally molded, it shall be repairable or replaceable. The edging itself shall not be susceptible to cutting, wear, or tear. The edging shall completely cover the bottom edge of the shell and extend up the sides a minimum of 0,70 cm of the helmet shell (according 3.5.5 of AR/PD 10-02, December, 14, 2010). The edging shall remain firmly attached to the shell. Usually a C-shaped piece, adhered with epoxy. The adhesion of the edging shall be determined by manual and visual inspection. A section or area of the edging shall be considered unbound when the edge can be rolled back on itself and away from the helmet by the thumb or finger.

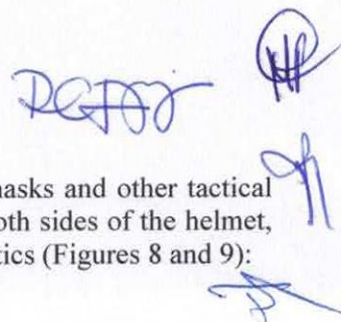
1.5 Holes and Drillings

Holes to attach components and accessories to the helmet shell shall be made before application of the coating. There shall be no delamination greater than 0,32 cm from the edge of the hole or other damage of the shell material as a result of making the hole (according 3.5.4 of AR/PD 10-02, December, 14, 2010).

2. ACCESSORIES

2.1 Accessory Rails Connectors (ARC)

The ARC will be used to attach and adjust accessories such as flashlights, visors, masks and other tactical communication systems and military sights. The rail connectors shall be placed on both sides of the helmet, they shall be like Ops Core ARC rails and shall have at least the following characteristics (Figures 8 and 9):



- a. they shall have the same shade as the color of the helmet shell;
- b. they shall be compatible with picatinny rail standard (MIL-STD-1913 and STANAG 2324);
- c. they shall have at least two picatinny adapters/mounts;
- d. they shall be easy to assemble and disassemble to allow cleaning and placement of helmet cover;
- e. they shall be attached to the shell using the same holes and drillings used for the retention system;
- f. they shall be lightweight and impact resistant (aluminum or High-strength polymers);
- g. they shall be compatible with Brazilian Army equipments; and
- h. they shall be compatible with ballistic visors and mandible protectors.

2.2 NVG Shroud

Component designed to be compatible with most Night Vision Goggles (NVG). It shall be placed on the center of front part of the helmet, it shall be like Ops Core VAS Shroud and shall have at least the following characteristics (Figures 10 and 11):

- a. it shall have the same shade as the color of the helmet shell;
- b. it shall be easy to assemble and disassemble;
- c. it shall be lightweight, sturdy and impact resistant (aluminum, high-resistance plastics or carbon fiber);
- d. it shall be compatible with Brazilian Army equipments;
- e. it shall be compatible with ballistic visors;
- f. it shall have a universal mounting system that allows compatibility with a variety of accessories (such as night vision devices, cameras and flashlights); and
- g. it shall ensure minimum or no play or wobble when used with night vision goggles.

2.3 Bungee System

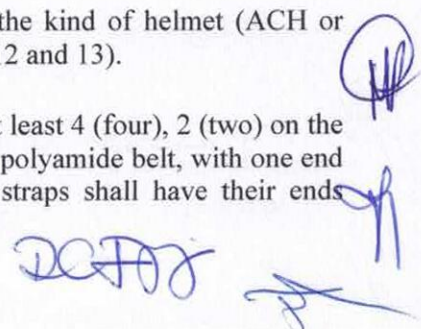
The helmet might have a pair of bungees (high tenacity elastic bands) with hooks (made of sturdy material), which shall be attached to the surface of the ARC rails, one on each side, for the attachment and support of NVG placed on the Shroud. The elastic bands shall have the same shade as the color of the helmet shell and the hooks shall be black.

2.4 Camouflage Helmet Cover

2.4.1 The helmet might have a textile cover to protect the finish of the helmet and allow for camouflage. **There must be at least another helmet cover as spare.**

2.4.2 The helmet cover shall have dimensions compatible with the size and the kind of helmet (ACH or ACH-HC) and shall not interfere with the use of the ARC and Shroud (Figures 12 and 13).

2.4.3 At the bottom, the helmet cover fastening straps are sewn, there shall be at least 4 (four), 2 (two) on the front and 2 on the back. The attachment straps shall be made from 20 mm wide polyamide belt, with one end fixed to the cover using reinforced stitching. The straps of the attachment straps shall have their ends finished to prevent them from fraying.



2.4.4 The attachment straps shall feature hook-and-loop fasteners at their free ends for attachment inside the helmet, onto the hook-and-loop fasteners securing the helmet's inner pads. The hook-and-loop fasteners of the attachment straps shall be applied to both sides of the free end of the straps, with the loop fastener face sewn on the side of the strap that will make contact with the helmet shell (side facing the interior of the cover), and the hook fastener face sewn into the side of the strap that will make contact with the helmet pads (side facing the outside of the cover) (Figure 14).

2.4.5 The helmet cover shall have hook fasteners at inner surface to allow a better attachment to the helmet. There shall be hook fasteners on the sides and nape area. They shall have dimensions and shapes compatible with the loop fasteners on the helmet shell (attachment will be via the loop fasteners specified for the helmet shell in Section 1.2).

2.4.6 The outer surface of the helmet cover shell shall have loop fasteners on the top, sides, and nape area to allow better attachment of the counterweight bag and for placement of identification patches:

a. loop fasteners on the side (Figure 12): there shall be a loop fastener on each side of helmet shell and they shall be symmetrical in relation to the helmet's midsagittal central plane and close to the position of the ARC rails. The dimensions are length (12.5 ± 0.5 cm), and width (5.0 ± 0.5 cm).

b. loop fastener on the nape area (Figures 16): it shall be symmetrical in relation to the midsagittal central plane of the helmet and close to the bottom edge. The dimensions are length (16.5 ± 0.5 cm), and width (5.0 ± 0.5 cm).

c. loop fastener on the top (Figures 15 and 16): it shall be positioned centrally at the top of the helmet shell and shall be symmetrical in relation to the helmet's midsagittal central plane. The length begins at the point of contact with the loop fastener in the nape area and extends to the top area of the helmet shell. The dimensions are width (5.0 ± 0.3 cm) and the length is approximately 19 cm.

2.4.7 The trimmings of the helmet cover shall be olive green (PANTONE 19-0419 TCX).

2.4.8 The sewing thread and attachment straps shall have following characteristics (Tables 4 e 5):

Table 4 – Sewing thread

Test	Standard	Requirement	Tolerance
Composition	AATCC 20 and AATCC 20A	100% Polyamide	-----
Linear Density	ASTM D 1059	750/3 dtex	$\pm 10\%$
Color	Visual Inspection	olive green (PANTONE 19-0419 TCX)	-----

Table 5 – Attachment straps

Test	Standard	Requirement	Tolerance
Composition	AATCC 20 and AATCC 20A	100% Polyamide	----
Structure	NBR 12996 / 12546 ISO 7211-1	Plain Weave	----
Thickness	ISO 5084/ASTM D 1777	0,6 mm	$\pm 0,1$
Width	Visual Inspection	20 mm	± 2
Color	Visual Inspection	olive green (PANTONE 19-0419 TCX)	----

2.4.9 The textile of the helmet cover shall have following characteristics (Table 6):

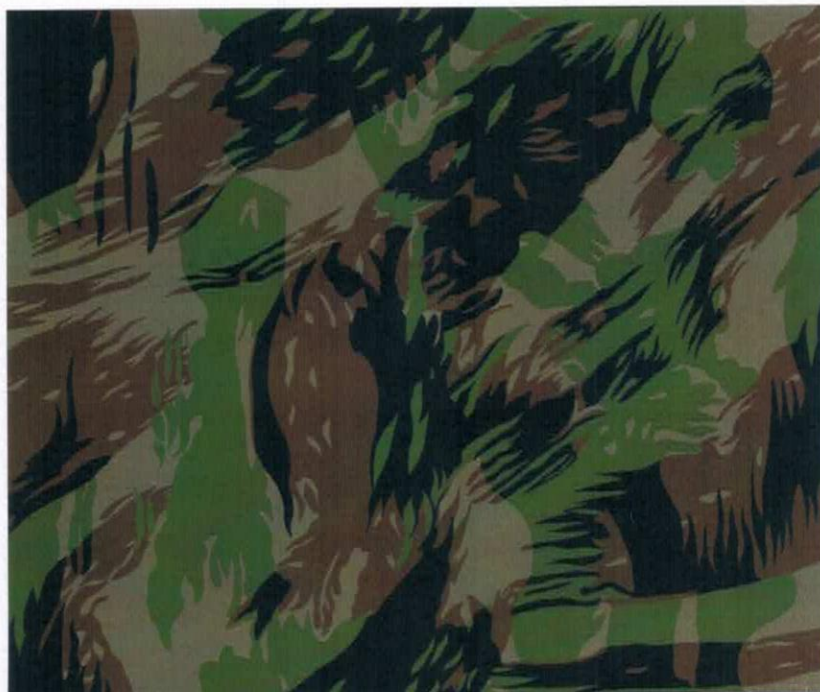
Table 6 – Textile Requirements

Test	Standard	Requirement	Tolerance
Composition	AATCC 20 and AATCC 20A	50% Polyamide and 50% Cotton	± 5%
Structure	NBR 12996 / 12546 ISO 7211-1	Plain Weave (Ripstop Effect Screen with 04 squares per inch in both directions (longitudinal and transversal)	± 0,5 squares in both directions
Mass	NBR 10591/ ISO 3801	225 g/m ²	± 15
Density	ASTM D1059	Warp – 20 Ne Weft – 16 Ne	± 2
Tensile strength	NBR 11912/ ISO 13934-1	Longitudinal – 750 N Transverse – 550 N	minimum
Elongation	NBR 11912/ ISO 13934-1	Longitudinal – 23% Transverse – 20%	minimum
Abrasion resistance	ISO 12947-2	200.000 cycles	minimum
Color fastness	ISO 105-B02 (40h)	Brown	Rate: 4-5
		Dark green	Rate: 4-5
		Light green	Rate: 4-5

2.4.10 **Helmet Cover Colorimetry** (AATCC EP 6 - “Evaluation Procedure 6 - Instrumental Color Measurement” and AATCC TM173 - “Calculation of Small Color Differences for Acceptability”).

Table 7 – Color pattern and maximum deviation

COLOR	D65/10°			A/10°			TL84/10°			$\Delta E_{CMC 2:1}$ maximum		
	L*	a*	b*	L*	a*	b*	L*	a*	b*	D65/10°	A/10°	TL84/10°
Dark green	23,77	-2,54	5,99	23,89	-1,96	5,91	24,16	-3,78	6,85	2.0	2.0	2.0
Brown	21,73	4,41	3,59	22,48	4,72	4,99	22,18	3,86	4,33			
Light green	41,73	-2,02	8,77	42,08	-1,58	8,96	42,32	-3,08	10,03			



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Handwritten signature and initials in blue ink.

Figure 1 – Rapport (illustration of the pattern in 1:2 scale)

NOTE: The image of the colors are merely illustrative, they shall be developed in accordance with the colorimetric coordinates present in Table 7 (Color pattern and maximum deviation).

2.5 Counterweight Bag

The counterweight bag will be used to balance the helmet when deploying NVG, making it more comfortable (Figure 17). The Counterweight bag shall be attached on the nape area of the helmet and shall have at least the following characteristics:

- a. the outer surface shall be predominantly olive green or foliage green;
- b. it shall be easy to assemble and disassemble to allow cleaning and placement/replacement of the helmet cover;
- c. it shall be attached to the shell using the same holes and drillings used for the retention system and accessories rails (Figure 19);
- d. it shall have a hook fastener at the rear side to allow better attachment to the helmet and ensure no wobble (Figure 20);
- f. it shall have at least five removable weights that fit in the same number of slots. Each removable weight shall have at least 45g and the total weight of the counterweight bag shall be at least 260g (Figure 18);
- g. the textile shall be made of nylon; and
- e. it shall have hook-and-loop fasteners to close the bag compartment where the removable weights are located.

Handwritten signatures and initials in blue ink, including a circular stamp with the letters 'NP' and several illegible signatures.

3. PICTURES

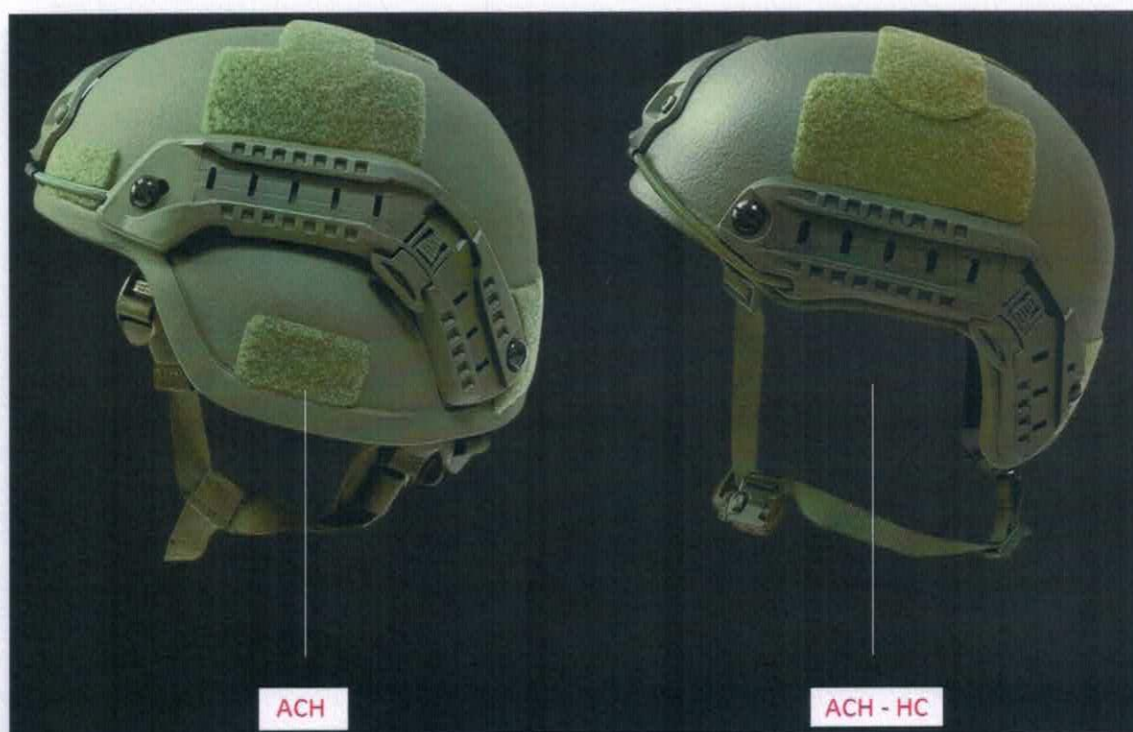


Figure 2 – Helmet types (shell)

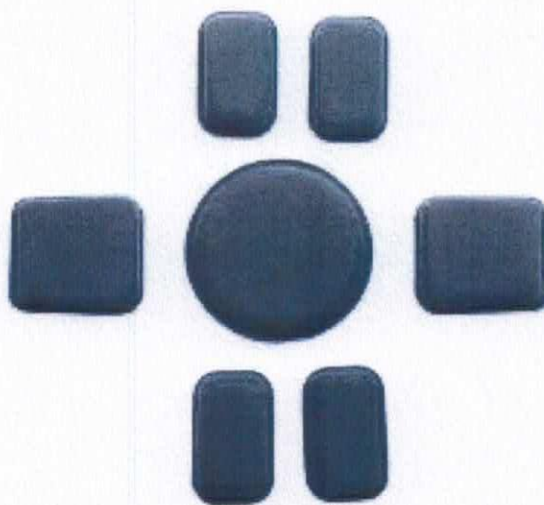


Figure 3 – Pad Suspension System

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Figure 4 – Pad Suspension System (inside the helmet)

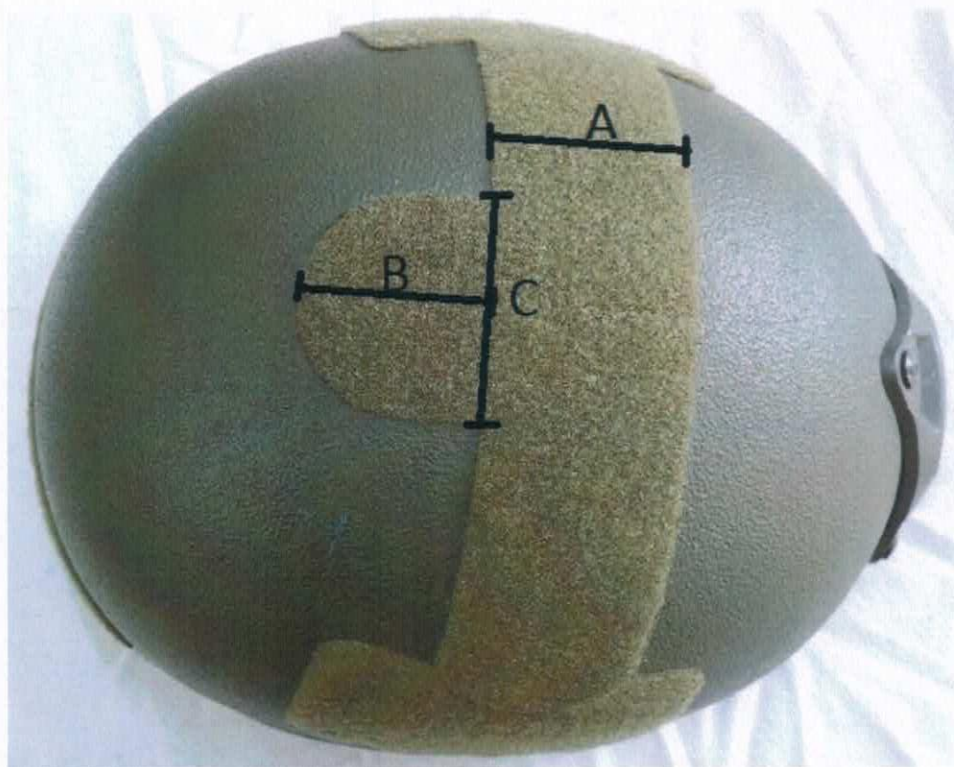


Figure 5 – Helmet Shell top view

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Figure 6 – Helmet Shell side view



Figure 7 – The nape area of the Helmet Shell

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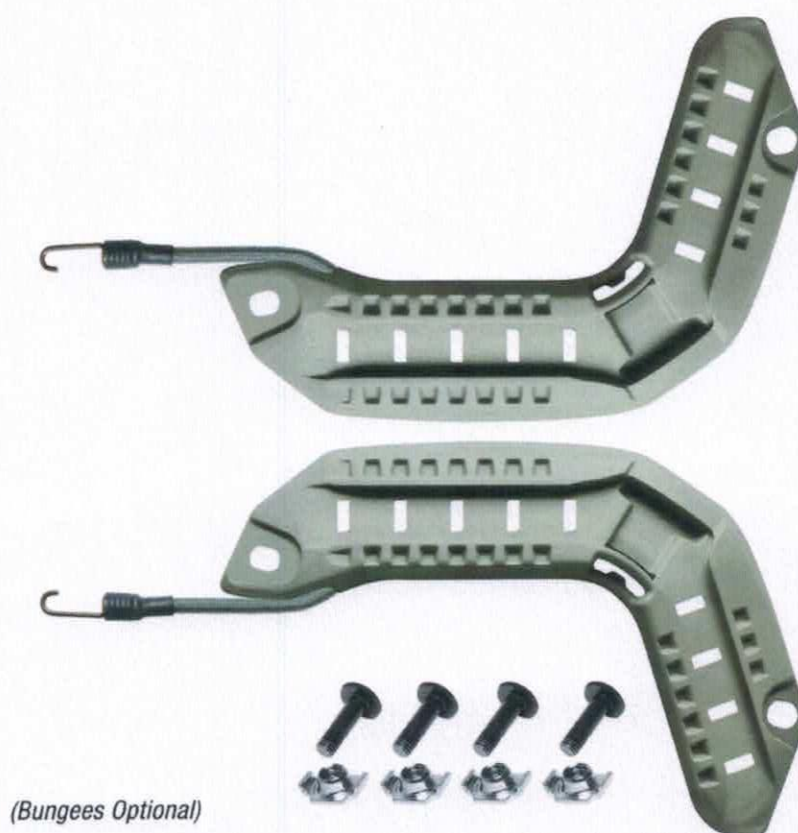


Figure 8 – ARC Rails



Figure 9 – Picatinny adapters/mounts

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Figure 10 – Shroud



Figure 11 – View of the Shroud position

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Figure 12 – Helmet cover side view



Figure 13 – Helmet cover front view

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Figure 14 – View of the helmet cover attachment



Figure 15 – Helmet cover top view

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Figure 16 – Helmet cover back view



Figure 17 – Counterweight Bag

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Figure 18 – Attachment of the counterweight bag



Figure 19 – Counterweight bag

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Figure 20 – Removable weights

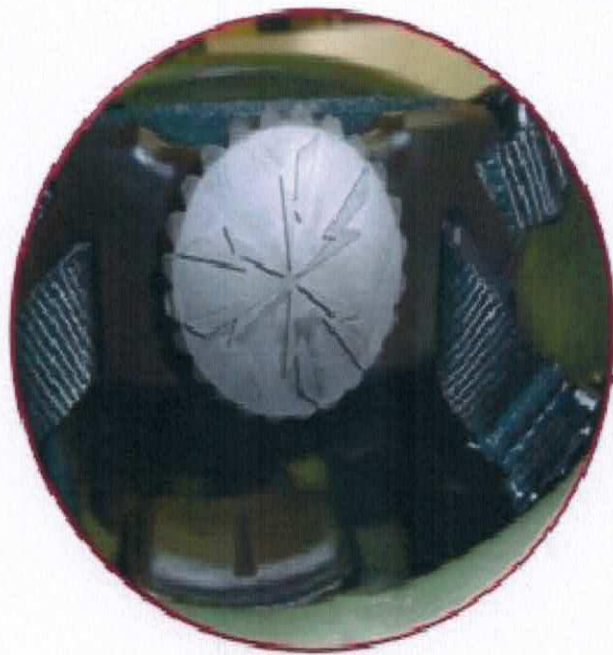


Figure 21 – Example of a system for adjustment

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4. IDENTIFICATION

4.1 Every ballistic helmet shall have a label. The label shall be permanently attached to interior surface of the shell. The label shall contain the following information, written in the **Portuguese language**:

- a. Name, logo or other identification of the manufacturer and name, logo or other identification of the supplier, just in case of manufacturer and supplier are not the same;
- b. The rated level of protection, according to NIJ STD 0108.01;
- c. Size;
- d. Lot number;
- e. Serial number;
- f. Date of manufacture;
- g. Date of validity;
- h. Contract reference (e.g. "CONTRATO Nr XX/20YY – COEx / C Sup); and
- i. It shall contain the ID SIGELOG:

Table 8 – ID SIGELOG (ACH containing only the camouflage helmet cover)

Color	Size	ID SIGELOG
Green	S	129 591
Green	M	129 607
Green	L	129 593
Green	XL	129 594

Table 9 – ID SIGELOG (ACH with all accessories defined in Section 2)

Color	Size	ID SIGELOG
Green	S	129 521
Green	M	129 575
Green	L	129 523
Green	XL	129 580

Table 10 – ID SIGELOG (ACH – HC with all accessories defined in Section 2)

Color	Size	ID SIGELOG
Green	S	128 224
Green	M	128 225
Green	L	128 226
Green	XL	129 470

5. REQUIREMENTS FOR PROTOTYPE AND LOT ACCEPTANCE TEST

5.1 The Ballistic helmet supplied shall be subjected to acceptance testing by one of the US laboratories authorized by NIJ (National Institute of Justice) or by an accredited laboratory by INMETRO/Brazil

(National Institute of Metrology, Quality, and Technology) to execute NIJ 0106.01 testing. **The test sample shall consist of 7 helmets per size and per fabrication lot.**

a. A technical delegation from Supply Board of Brazilian Army, except in cases of force majeure, shall accompany the acceptance test, as well as performing a visual inspection of the sample to check the visual compliance of the samples with the technical specification.

5.2 Ballistic helmet shall be tested in accordance with the items 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8 and Section 5 of NIJ STD 0106.01 and items 4.4 and 5.2.4 for NIJ STD 0108.01 for protection level IIIA. **For the Ballistic Impact Attenuation Test only the 9 mm (item 5.2.4.2 of NIJ STD 0108.01) test will be required.**

a. Test samples will be selected according to Table 11. **See notes of Table 11 for conditioned samples.**

Table 11 – Number of Samples for level III-A Tests

TEST	LEVEL III-A			
	AMOUNT OF HELMETS BY SIZE			
	NEW	CONDITIONED ⁽¹⁾	SPARE	TOTAL
Ballistic Penetration	2	2	1	5
Ballistic Impact Attenuation	1	0	1	2
TOTAL	3	2	2	7

Obs (1): For conditioned samples: the helmet shall be subjected to the conditioning protocol by water immersion described in section 5.2 of NIJ STD 0106.01 prior to ballistic testing.

b. Test Report shall contain:

- 1) result of compliance with item 4.3 through 4.6 of NIJ STD 0106.01. Samples that do not meet the requirements shall be reported;
- 2) result of Ballistic Penetration Test, according to item 5.2 of NIJ STD 0106.01; and
- 3) result of Ballistic Impact Attenuation Test, only for 9 mm (item 5.2.4.2 of NIJ STD 0108.01) **with the results of peak acceleration**, according to item 5.3 of NIJ STD 0106.01.

CAMOUFLAGE HELMET COVER TESTS

5.3 The camouflage helmet cover supplied shall be subjected to a **prototype acceptance test** and a **lot acceptance test** by one of the laboratories accredited by INMETRO/Brazil (National Institute of Metrology, Quality and Technology), or by an organization affiliated to ILAC (International Laboratory Accreditation Cooperation), to carry out the test of the textile (Table 6) and the test report must be delivered as part of the documentation for conformity assessment, according Bidding Terms.

a. **If the delivery of the material is divided into more than one batch, each delivery batch must be submitted to a Lot Acceptance Test.**

6. APPROVAL CRITERIA

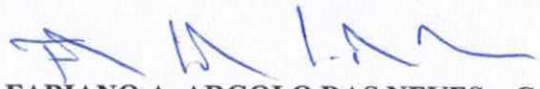
6.1 Ballistic Penetration Test, according requirements of 4.7 of NIJ STD 0106.01;

6.2 Ballistic Impact Attenuation Test for 9 mm (item 5.2.4.2 of NIJ STD 0108.01), according requirements of 4.8 of NIJ STD 0106.01; and

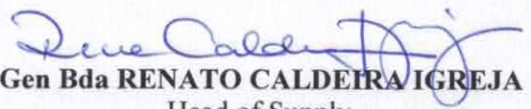
6.3 Compliance of visual inspection of the sample with the technical specification.

6.4 Only after receiving the Test Report of acceptance testing, Supply Board of Brazilian Army will issue a technical decision on the results of acceptance testing.

7. TECHNICAL MANAGERS

Brasília, April, <u>16th</u> 2024.  MARCO POLO AGRA S. DOS SANTOS – Cap Member of Div Tec	Brasília, April, <u>16th</u> 2024.  FABIANO A. ARGOLO DAS NEVES – Cap Member of Div Tec
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8. APPROVED BY

Specification Nr 211/2024 – D Abst – Ballistic helmet level III-A.	APPROVED BY
Brasília, April, <u>16th</u> 2024.  JOSÉ MAURÍCIO L. MARTINS DE SÁ – QEM/FC R/1 Technical Reviewer	Brasília, April, <u>16th</u> 2024.  Gen Bda RENATO CALDEIRA IGREJA Head of Supply